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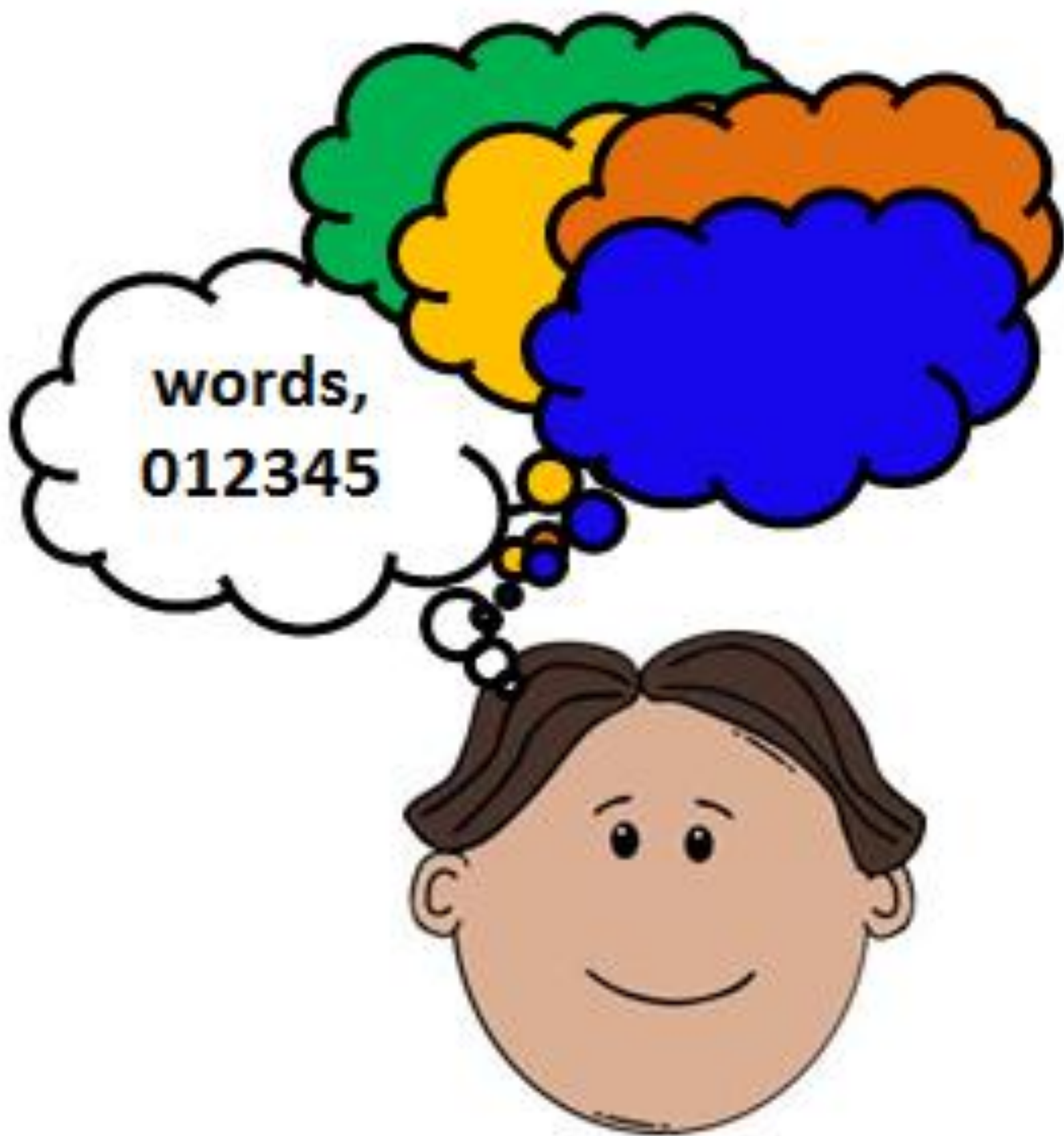
Visual Associative Memory: Age- and Individual differences during Learning & Retrieval

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Introduction

Grapheme – colour Synaesthesia



- Fact 1:** Grapheme – colour Synaesthesia improves visual associative memory and visual memory in general¹
- Fact 2:** Elderly participants have impaired memory for visual associations, but memory for individual items is preserved relative to control young control subjects²

Predictions

- Performance accuracy on *pair – associative memory* is expected to yield a significant group effect:
Synaesthetes > Controls > Elderly
 - Performance accuracy on *single item memory* will show the same pattern as for pair – associates, but is not expected to be significant
- Exploratory question**
- Do Synaesthetes show a memory advantage during learning³ or retrieval¹ of pair – associates, or both ?

Method

Participants

7 young Synaesthetes [M=22 (3.56)]; 7 Elderly [M=67 (7.4)]; 7 young Controls [M=23 (3.4)]

Learning Phase

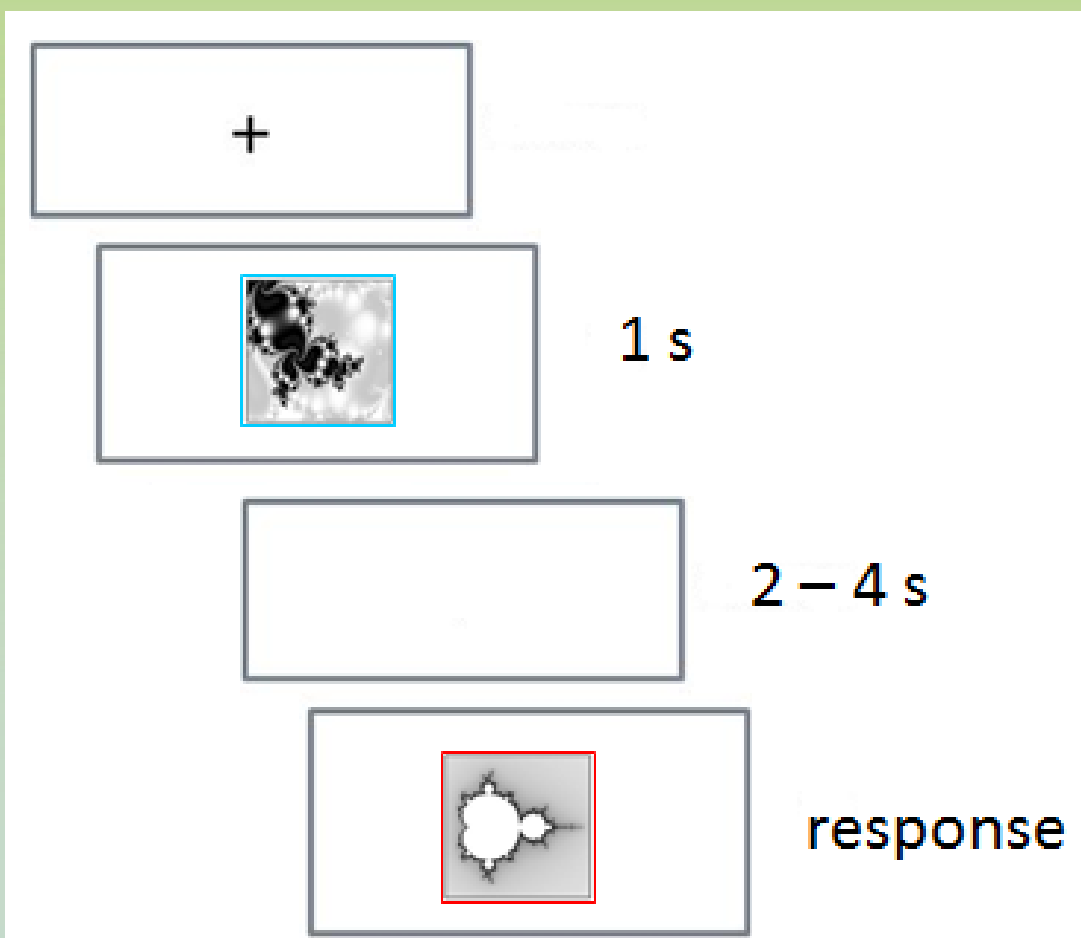
→ *Pair – associative learning*
Participants learned 8 pair – associates to 87% criterion

Memory load manipulation

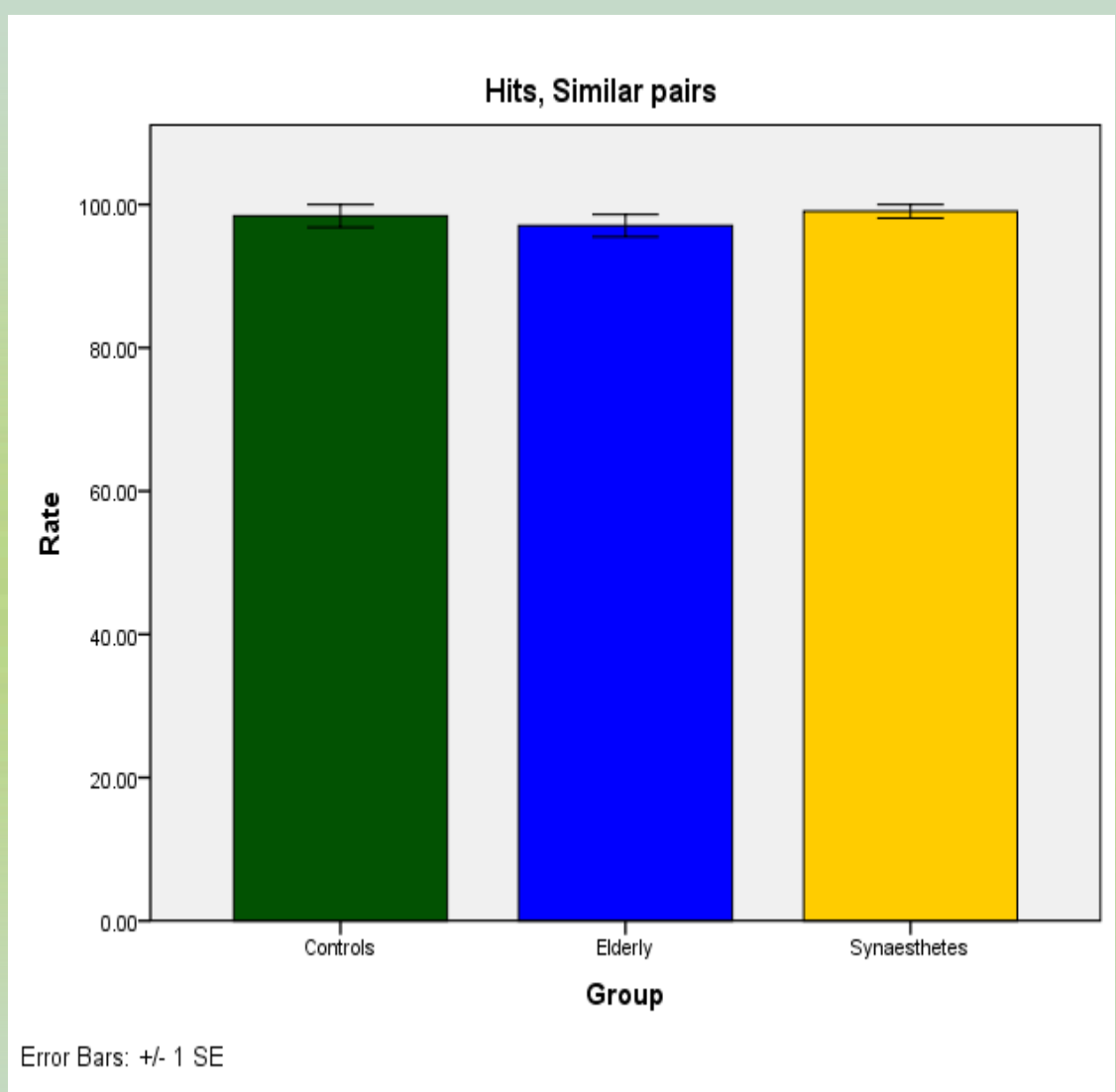
5 visually dissimilar pairs	3 visually similar pairs

→ *Singleton learning*
Participants learned 8 single fractal images to 87% criterion

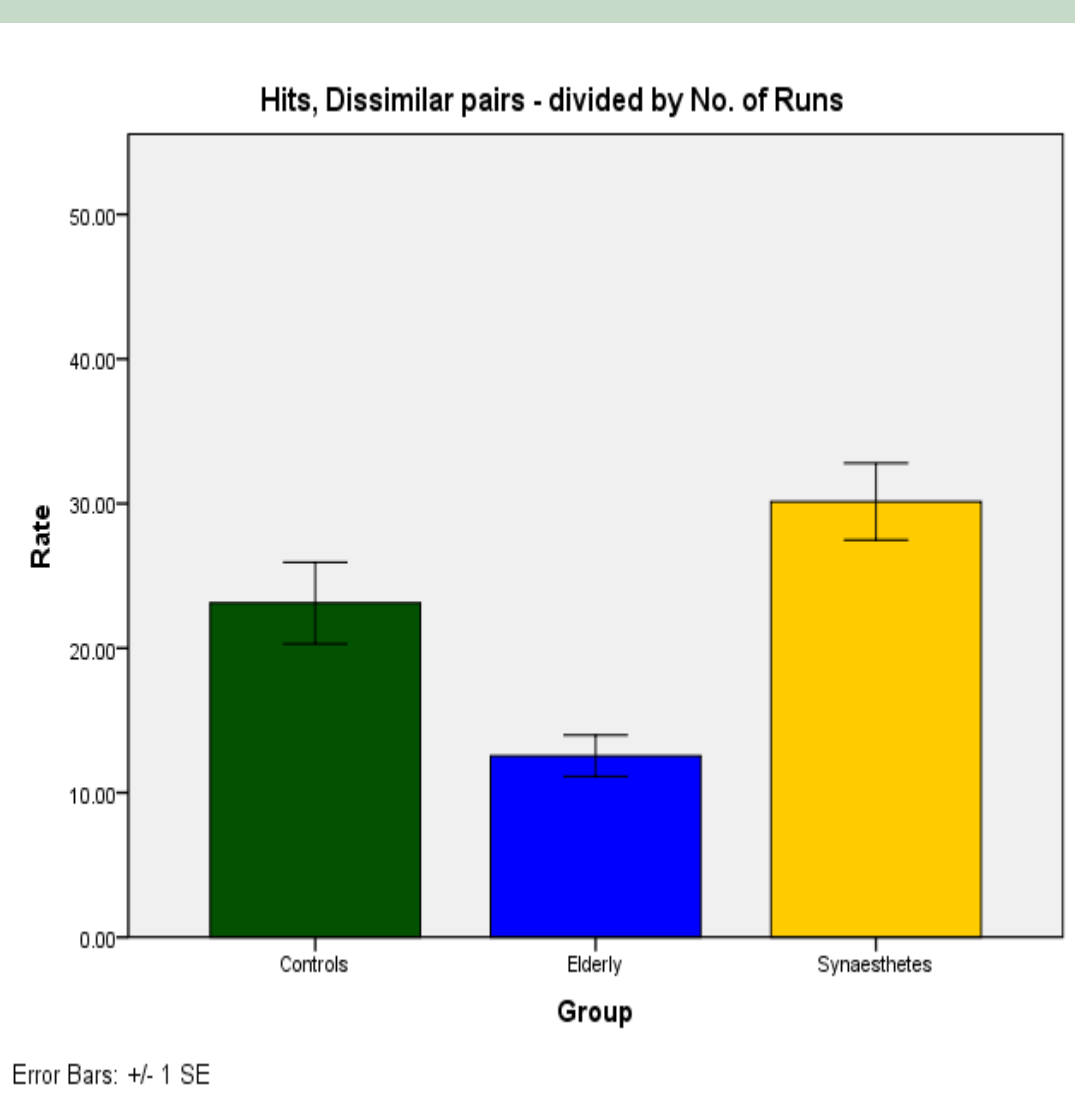
Pair – associative retrieval



Results, Pair - learning



→ No effect of group $F[2,60] = .536, p = .588$

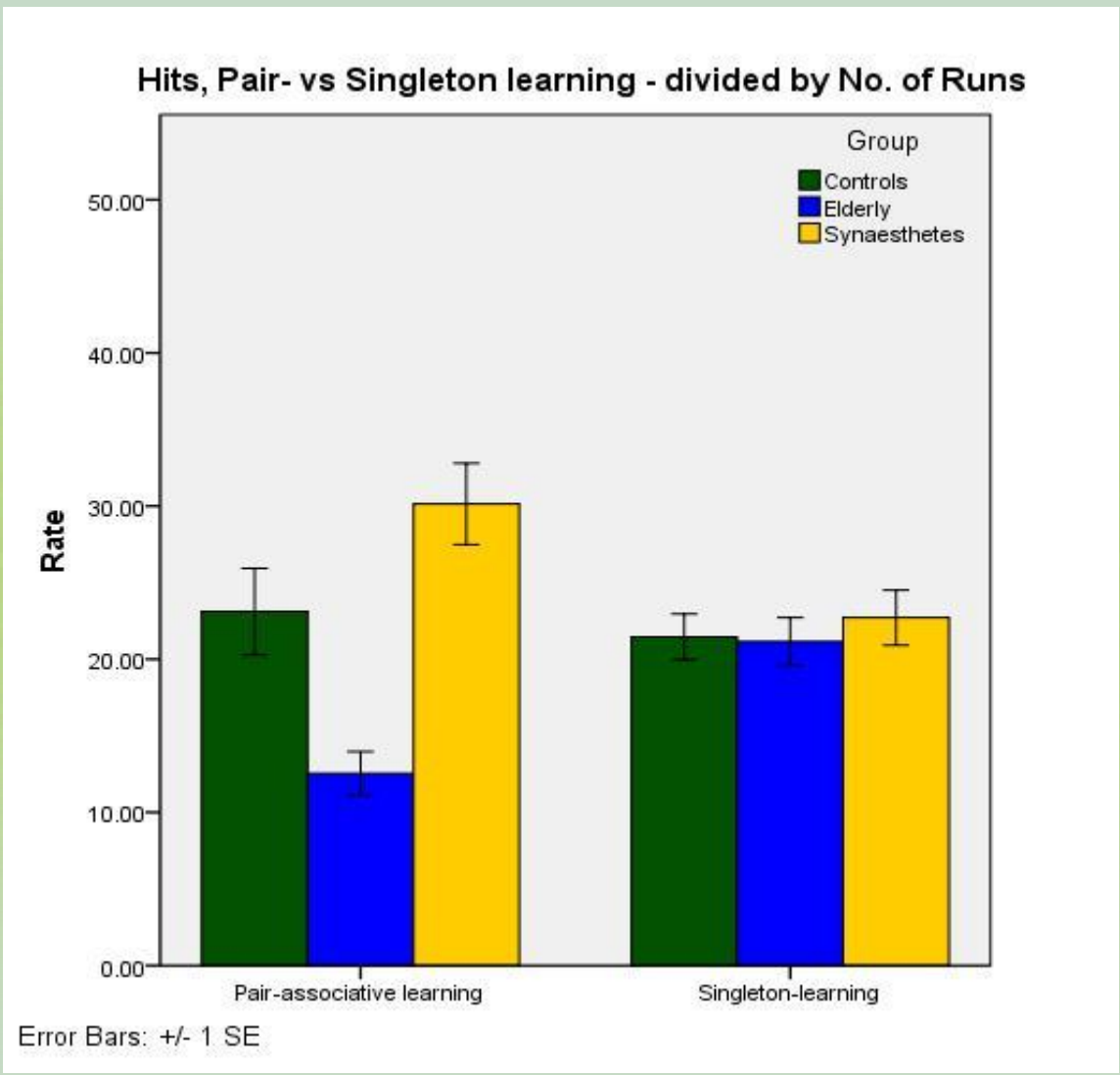


→ Sign. effect of group $F[2,102] = 13.81, p < .001$

Mean No. of Runs
Controls = 4.14 (SE = .86)
Elderly = 8.14 (SE = 2.09)
Syns = 3.14 (SE = .46)

Syns > Cont, $p = .098$
Cont > Old, $p = .006$
Syns > Old, $p < .001$

Results, Pair - vs Singleton learning

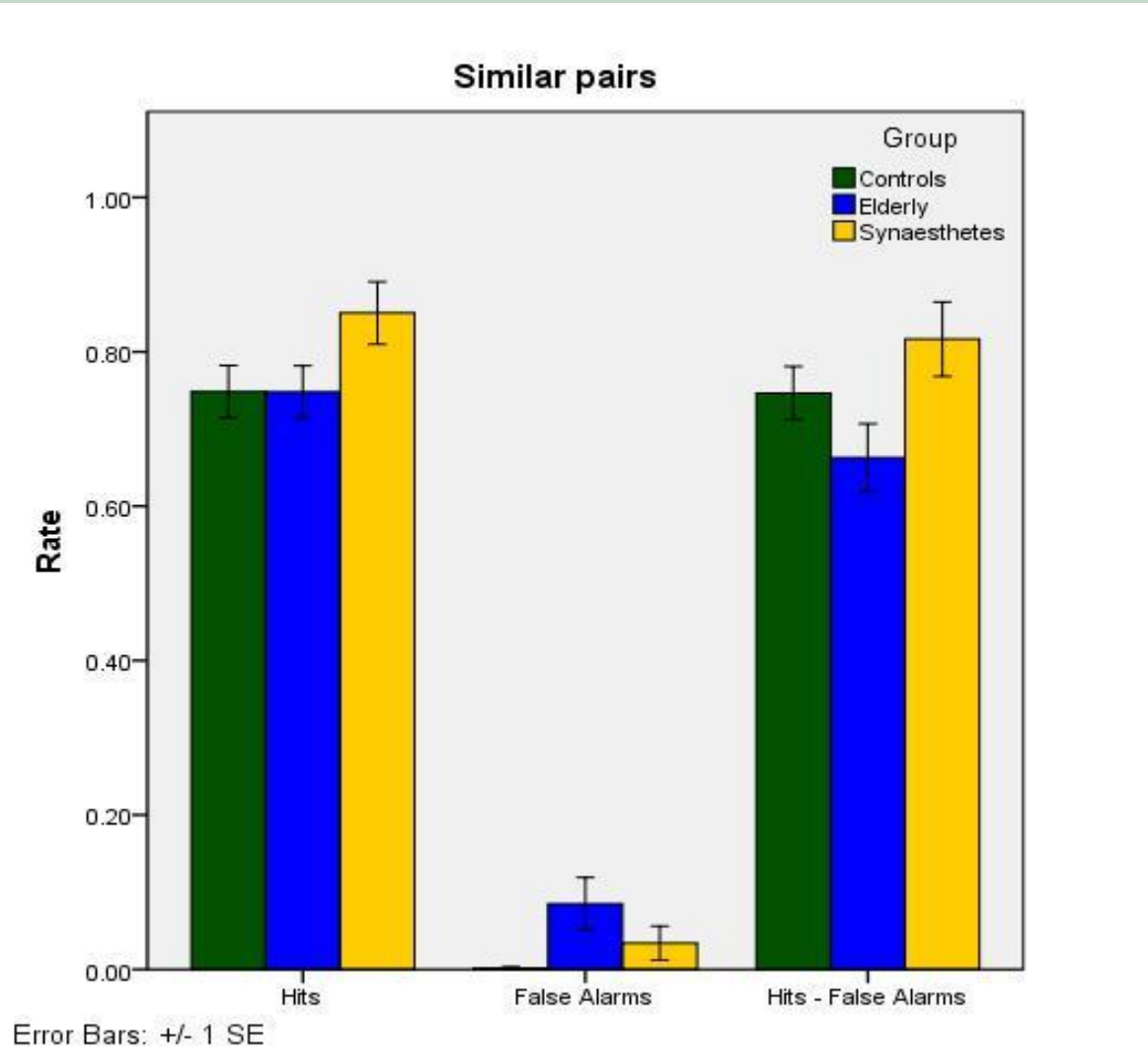


Note: Pair-associative learning = dissimilar pairs only

→ No effect of Learning Type
 $F[1,102] = .01, p = .921$
→ Main effect of group
 $F[2,102] = 9.91, p < .001$
→ Sign. interaction
 $F[2,102] = 9.03, p < .001$

Syns > Control, $p = .058$
Control > Elderly, $p = .013$
Syns > Elderly, $p < .001$

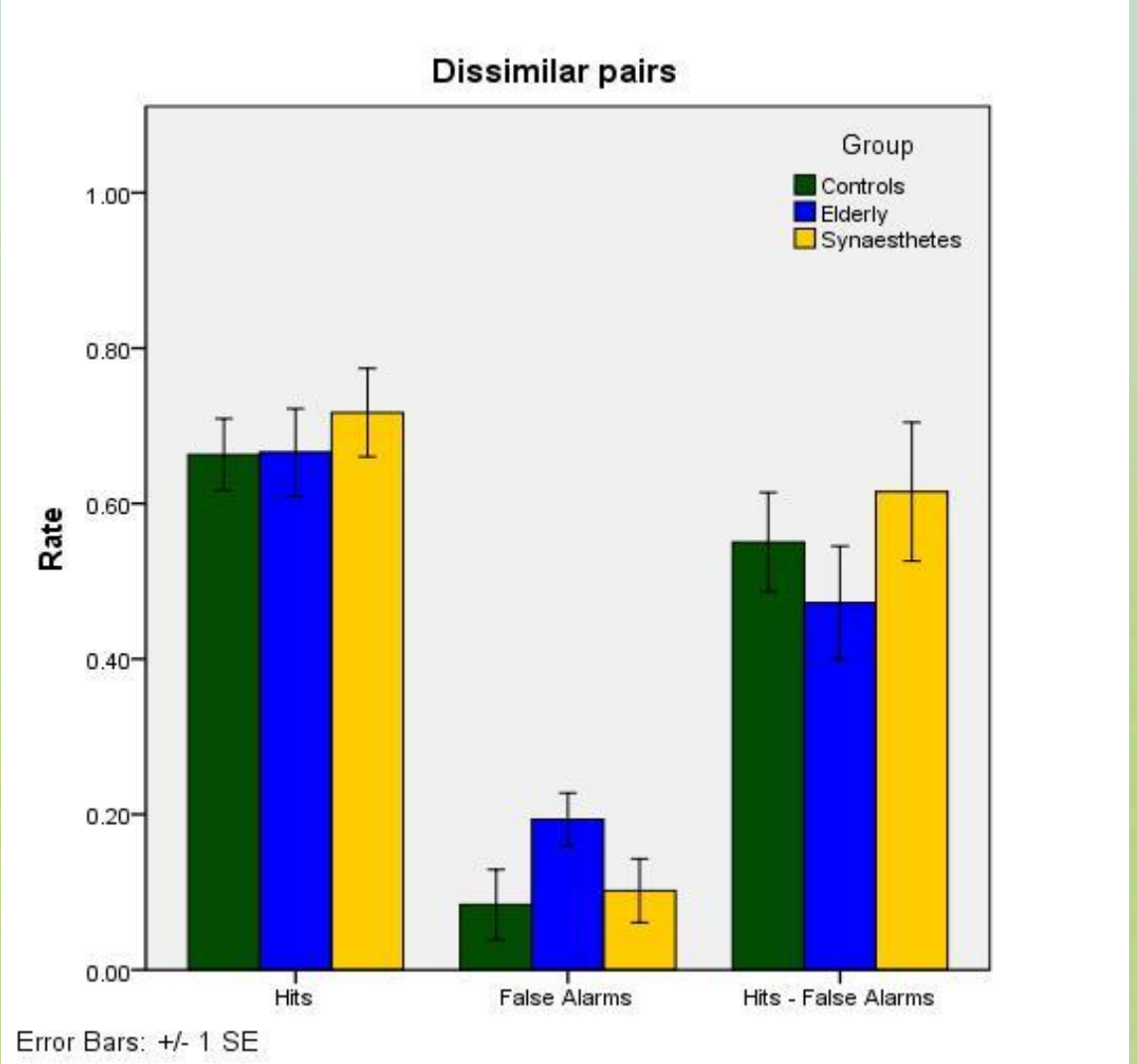
Results, Pair-associative retrieval



d-prime

Controls = 1.58 (SE = .07)
Elderly = 1.37 (SE = .12)
Synaesthetes = 1.64 (SE = .37)
 $F[1,60] = 2.38, p = .101$

Note: higher d' = better discrimination between target-match and target non-match



d-prime

Controls = 1.02 (SE = .08)
Elderly = .73 (SE = .11)
Synaesthetes = .99 (SE = .10)
 $F[1,102] = 2.51, p = .086$

Conclusions

Visual associative learning

- Synaesthesia leads to a significant advantage in associative learning of visually unrelated (dissimilar) information, but shows no advantage on associating visually similar items or on learning single items.
- By contrast, Age significantly impairs the ability to associate visually unrelated information, but spares associative learning for visually similar items and single items.

Visual associative memory

- Synaesthetes showed no persistent associative memory advantage at retrieval, an effect that appeared to be influenced by poorer discrimination ability between true and false associations.

References

- ¹ Rothen, N. & Meier, B. (2010). Grapheme - colour synaesthesia yields an ordinary rather than extraordinary memory advantage: Evidence from a group study. *Memory*. 18:258 – 264.
- ² Naveh-Benjamin, M., et al. (2009). Adult age differences in memory for name-face associations: The effects of intentional and incidental learning. *Memory*. 17(2):220 – 232.
- ³ Gross, V.C., et al. (2011). Superior encoding enhances recall in color - graphemic synesthesia. *Memory*. 17(2):220 – 232.

Acknowledgements

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